



## Improvements in or relating to Pneumatic Tyre Casings.

We, THE INDIA RUBBER, GUTTA PERCHA AND TELEGRAPH WORKS COMPANY LIMITED, of 106, Cannon Street, London, E.C. 4, a British Company, and WILLIAM LEICESTER AVERY, of the said Company's Works at Silvertown, London, E. 16, a British Subject, do hereby declare the nature of this invention to be as follows:—

This invention comprises improvements in or relating to pneumatic tyre casings and in particular to that type of tyre casing wherein the textile foundation of the casing comprises a plurality of layers each comprising one or more lengths of cord wound backwards and forwards across the casing and looped around transverse pins or staples in the edges of the casing.

In order to render the edges of the casing inextensible it has heretofore been proposed to loop the aforesaid cord on either side of the casing around pins projecting from and integral with a metal ring. A casing so constructed has the disadvantage that the edges of the casing are not only inextensible but also laterally inflexible, which renders such casings difficult to fit to rims.

The object of the present invention is to provide an improved construction of casing of the type described having inextensible edges.

According to this invention in casings of the type described each edge is provided with one or more laterally flexible inextensible rings disposed between adjacent layers of cord, said rings encircling but being separate from the transverse pins.

The aforesaid rings may comprise endless cabled wires, endless triangular or other section members built up of flat braided wire, or may be of other constructions giving the required characteristics of inextensibility and lateral flexibility.

According to one way of carrying out this invention the casing is built up in the usual manner on an annular core of the usual toric shape having circumferential arranged and spaced pins projecting laterally from the side margins adjacent the inner periphery. The cords are looped from side to side around said pins across

the core obliquely to the circumferential centre line of the core. Two layers of cord are so laid on the core one upon the other, the cords in the one layer extending across the core obliquely in opposite directions. The cord may be flattened, having a major and a minor axis and each length extending across the core may be twisted so that it lies with its major axis parallel to the surface of the core at the central circumferential line thereof, but with said axis at right angles to the surface when it passes around the pins at the side of the core.

After the casing has been so built up it is removed from the core, the side edges of the casing being lifted away from the pins. Thereafter there is inserted between the cord layers in each edge an endless circular ring of cabled wire, having an internal diameter just greater than that of the edges of the cord foundation of the casing. Straight pins are then placed through from the loops of one layer to the adjacent loops in the other layer across the inner periphery of the ring. The edges of the casing are then finished by the addition of suitable protective fabric strips and the casing is subsequently otherwise completed and moulded and vulcanised. Preferably the aforesaid cabled wire rings are covered with fabric before insertion in the edges of the casing. Instead of cabled wire rings, triangular rings built up in the manner heretofore known from flat braided wire could be inserted in a similar way, the said rings being of right angled triangular shape, the base of the triangle being toward the pins and the hypotenuse toward the inside of the casing.

Where cabled wire rings are used, the pins instead of being straight may have straight end portions in the same straight line and a central curved portion between, the pins being positioned in the edges of the casing with the convex side of the curved portions towards the throughway axis of the casing, the concave side thereof providing a seating for the rings. In such a case the rings would be, of course, of slightly smaller diameter than if straight pins were used.

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In a still further arrangement the rings may comprise laterally flexible flat sided thin steel strips, the flat sides of which are at right angles to the throughway axis of the casing. The said strips may be inserted between the cord layers at the edges of the casing and have holes through which the pins loosely pass.

The foundation may comprise more than

two layers in which case laterally flexible inextensible rings may be inserted between each pair of adjacent layers or only between one pair in each edge as the case may require. 10

Dated this 25th day of October, 1928.

A. G. BROWN,  
Acting for the Applicants.

## COMPLETE SPECIFICATION.

### Improvements in or relating to Pneumatic Tyre Casings.

15 We, THE INDIA RUBBER, GUTTA PERCHA AND TELEGRAPH WORKS COMPANY LIMITED, of 106, Cannon Street, London, E.C. 4, a British Company, and WILLIAM LEICESTER AVERY, of the said Company's Works at Silvertown, London, E. 16, a British Subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

25 This invention comprises improvements in or relating to pneumatic tyre casings and in particular to that type of tyre casing wherein the textile foundation of the casing comprises a plurality of layers each comprising one or more lengths of cord wound backwards and forwards across the casing and looped around transverse metallic pins or staples in the edges of the casing.

30 In order to render the edges of a casing of the type referred to inextensible, it has heretofore been proposed in British Patent Specification No. 1940 of 1910 to loop the aforesaid cord on either side of the casing around pins which project from and are integral with a metal strip or ring. In one construction shown in the above specification the pins are integral with and project inwardly from one or both edges of a rigid U shaped strip or ring within which is located a metal ring of circular cross section. In another form the pins are integral with and project on both sides of a metal ring which is located within a rigid U section metal ring within the edges of the casing.

50 Casings constructed according to the aforesaid specification have the disadvantage that the edges are substantially rigid laterally, which renders the casing difficult to fit to a rim.

55 According to this invention in a casing of the type referred to in the first paragraph of this specification, each edge of the casing is provided with one or more endless laterally flexible metallic rings and the metallic transverse pins or staples

located in each edge of the casing lie within the said ring or rings or within a continuous circumferential portion thereof and are metallically unattached to said ring or rings. 65

70 The transverse pins in each edge of the casing may be metallically connected one to another, for instance they may be formed out of a continuous length of wire. Preferably, however, they are metallically unattached one to another.

75 Preferably each of the said rings lies between two adjacent layers of cord, the said cord being looped around the transverse pins on either side of the said ring.

80 The aforesaid rings may comprise endless cabled wires, endless triangular or other section members built up of flat braided wire, or may be of other constructions giving the required characteristics of inextensibility and lateral flexibility.

85 The accompanying drawings illustrate this invention.

Figure 1 is a cross-sectional view of the edge of a tyre casing according to one embodiment of this invention.

90 Figure 2 is a side skeleton view of a portion of the edge of the tyre casing shown in Figure 1.

Figure 3 is a cross-sectional view of the edge of a tyre casing according to another embodiment of this invention. 95

Figure 4 is a cross-sectional view of the edge of a tyre casing according to another embodiment of this invention.

Figure 5 is a side skeleton view of a portion of the edge of the casing shown in Figure 4. 100

Figure 6 shows a portion of the ring and the transverse pins incorporated in the edge of the casing shown in Figures 4 and 5. 105

Referring to Figures 1 and 2, the casing has two layers A and B of cords which are looped around the pins C each of which comprises a central curved portion C1 and straight end portions C2 and C3. The pins C are so disposed that the central curved portion C1 projects towards the 110

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central throughway axis of the tyre casing. The layers A and B of cord are respectively looped around the straight end portions C2 and C3 of the pins C and between said layers is an endless inextensible laterally flexible core or ring D which encircles the said pins, lying against the concave side of the curved portion of each pin. The core D comprises a stranded wire centre D1 surrounded with a fabric wrapping D2. Suitable consolidating and chafing strips are applied about the edge of the casing and the space between the cord layers above the core D is filled with rubber or fabric filling.

In Figure 3 the layers of cord A1 and B1 are looped about the ends of straight pins E, and the endless core or ring F which encircles the pins between the said layers is made up of layers of flat braided wire tape (which is well-known in the art), the said layers lying at right angles to the axis of the casing.

In Figures 4, 5 and 6 the layers of cord A2 and B2 in the edge of the casing are looped around the ends of pins G which pass loosely and freely through holes in a laterally flexible ring of strip metal H which is disposed between the said layers of cord. It will be appreciated that in this case the outer circumference of the ring H provides a continuous circumferential portion thereof encircling the pins G.

In building casings according to any of the embodiments just described, the casing is built up in the usual manner on an annular core or former of the usual toric shape having circumferentially arranged and spaced pins projecting laterally from the skirts of the former adjacent its inner periphery. The cords are laid from side to side of the former obliquely to the circumferential centre line of the former and looped around the pins in the skirts thereof.

The two layers of cord are so laid one upon the other that the cords in one layer extend across the former obliquely in the opposite direction to the cords of the other layers, the cords thus crossing. The cord may be flattened, having a major and a minor axis and each length as it extends across the former may be twisted so that it lies with the major axis parallel to the surface of the former at the central circumferential line thereof, but with the said axis at right angles to the surface where the cord passes around the pins in the skirts of the former.

After the casing has been so built up it is removed from the former the side edges of the casing being lifted away from the pins. Thereafter the endless ring—whichever form it may take—is

inserted between the layers together with suitable filling pieces or strips where necessary. The pins that are to be permanently in the edges of the casing are next inserted through the loops of the cord layers and the edges finished by the addition of suitable chafing and consolidating strips. The casing is then otherwise completed and moulded and vulcanised in the usual manner.

The foundation may comprise more than two layers of cord, in which case laterally flexible inextensible rings may be inserted between each pair of adjacent layers or only between one pair in each edge as desired.

In the embodiment illustrated in Figures 4, 5 and 6, instead of pins passing through holes in the ring, they may pass through slots therein, the said slots extending into the ring from the internal circumference thereof.

Many modifications may be made within the scope of the appended claims.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A casing of the type referred to in the first paragraph of this specification in which each edge of the casing is provided with one or more endless laterally flexible metallic rings and in which the metallic transverse pins or staples located in each edge of the casing lie within the said ring or rings or within a continuous circumferential portion thereof and are metalically unattached to the said ring or rings.

2. A casing according to claim 1 in which the transverse metallic pins or staples are metalically unattached one to another.

3. A casing according to claim 1 or claim 2 in which each of the said rings lies between two adjacent layers of cord, the said cord being looped around the transverse pins on either side of the said ring.

4. A casing according to claim 3 and having edges substantially as described with reference to Figures 1 and 2 of the accompanying drawings.

5. A casing according to claim 3 and having edges substantially as described with reference to Figure 3 of the accompanying drawings.

6. A casing according to claim 3 and having edges substantially as described with reference to Figures 4, 5 & 6 of the accompanying drawings.

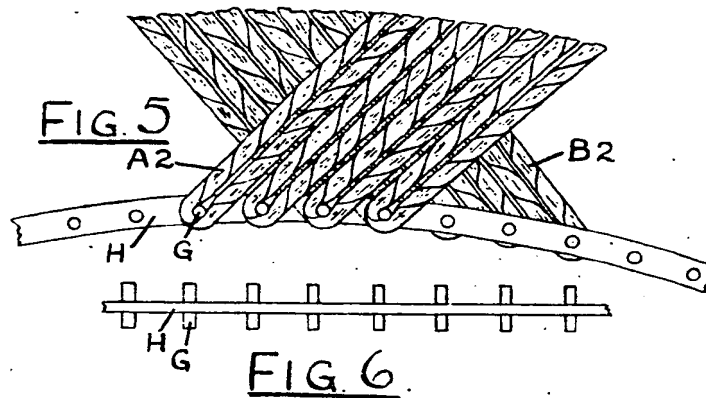
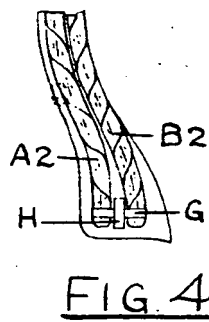
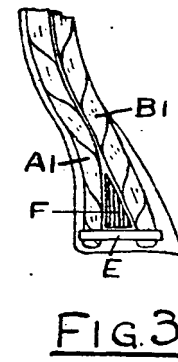
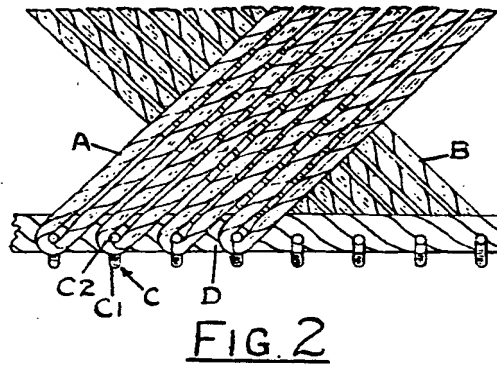
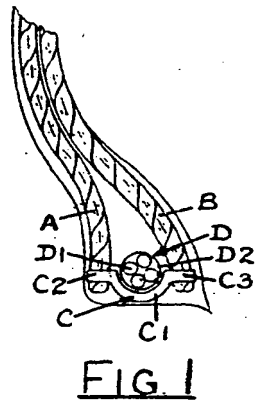
Dated this 24th day of July, 1929.

A. G. BROWN,  
Acting for the Applicants.

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